

of genera and species, perhaps the attractiveness of the idea and the ease with which it enables us to dimly understand many biogenetic problems permits us to lose sight of other influences more obscure, but of equal importance in the history of life."

This view of the subject seems to derive still further support from the geographical and bathymetrical distribution of the species. Without entering into a lengthy discussion of this part of the subject, it may be said that as a rule the more complex species are found in the warmer waters under conditions most favourable to the activity of nutritive processes. As an example, the very large specimens of *O. complanata* from Fiji reef may be taken. On the other hand, the ancestral form *O. tenuissima* still inhabits the colder and deeper waters, retaining the simple characters of its earliest known condition.

XIII.—*Additions to the present Knowledge of the Vertebrate Zoology of Persia.* By JAMES A. MURRAY.

SINCE the publication of Mr. Blanford's valuable work on the Zoology of Persia (1876), giving a complete list of the animals inhabiting that country, nothing, I believe, has been published as an additional contribution, except a single paper in the Proc. Zool. Soc. for 1881, which added five species to the already large list of reptiles; these are *Agama persica*, *Scincus conirostris*, *Hydrophis temporalis*, *Catachlana diadema*, and *Hydrophis cyanocincta*, the first three being newly described species.

The Kurrachee Museum, having now rather an extensive collection of Mammals, Birds, and Reptiles from Eastern Persia—very kindly made for the institution by Mr. W. D. Cumming, of the Persian Telegraph, during the past three years—and having also acquired a collection, comprising thirty-six species of Reptiles and seven Mammals (also from Persia)—made, it is said, by a member of some foreign exploring commission in 1876–77—I am enabled, after careful examination of these materials, to add a few more species to the existing knowledge of the Vertebrate fauna of the country.

For the collection said to be made by a member of some foreign commission, the institution is indebted to Mr. Possman, also of the Persian Telegraph. Although this collection dates as far back as 1876–77 the specimens are in an excel-

lent state of preservation; each specimen has been carefully labelled, giving the date, year, and localities of capture, the latter being chiefly Bushire, Tanjistan, and Charbagh, near Bushire.

Among *Mammals* there is nothing new, but a few species, of the occurrence of which Mr. Blanford seemed to doubt and which are comprised in the collection, are noted below.

1. *Rhinolophus ferrum-equinum*, Schreb.

Rhinolophus ferrum-equinum, Schreb., Blf. E. Pers. ii. p. 19.

1 ♂: Bushire, 26. 11. 83.

2. *Ursus thibetanus*, F. Cuv.

Ursus, sp. ♀, Blf. E. Pers. p. 47.

Ursus gedrosianus, Blf. J. A. S. B. xlvi. pt. 2, p. 317; P. A. S. B. 1879, p. 4.

Mr. Blanford records this from Beloochistan, on the assurance of the natives of the country. Major Mockler very kindly procured for me three skins with skulls of the animal inhabiting the Beloochistan hills. These with two other skins from the Sind hills were those of *Ursus thibetanus*. There is now a live specimen in the Kurrachee Zoological Gardens, from the Sind hills.

3. *Delphinus plumbeus*, Duss.

Not recorded in Zool. E. Pers. The Kurrachee Museum has two skulls from Lingah.

4. *Dipus Blanfordi*, sp. nov.

Dipus maerotarsus?, Wagner, Blf. E. Pers. p. 74.

1 ♂, 1 ♀ adult (pregnant), and two adolescent: Bushire, July 1882.

Four juv.: Tangak, May 1877.

One adolescent, Tanjistan, June 1877.

These agree in every particular with Mr. Blanford's description. The long black tuft of hair beneath the hind feet is very characteristic, also the broad whitish band across the upper part of the thigh and the rufescent fawn thigh-patch. These differences being constant, the Persian form must be considered distinct; and Mr. Blanford having first characterized the species, I have much pleasure in associating his name with it.

I must, however, add the following particulars to the description given by Mr. Blanford:—Mammæ 8—one pair under the throat in front of the fore legs, one pair behind

the fore legs, and two inguinal pairs. In adults the tail is unicolorous up to the pencil of hairs and of a pale isabelline colour, while the black portion of the pencil in adolescents is a dark brown, tinged slightly with rufescent; the back is much darker in colour in adults, owing to the bases of the hairs, which are of a dark ash-colour, showing through; claws horny. Molars of upper jaw all biphicate, inside and out: of lower jaw, 1st biphicate on both sides, 2nd triplicate without and biphicate within, 3rd *biphicate outside and rounded* within.

The following are dimensions of an adult pregnant female and an adolescent male:—

	Adult ♀. in.	Adolescent ♂. in.
Length from tip of nose to root of tail	5·25	3·75
Ditto of tail	7·2	6·0
Ditto of pencil at end of tail	0·75	0·56
Total length	13·2	10·31
Height of ear from upper margin of outer conch	0·75	0·5
Ditto from base of skull	0·82	
Breadth of ear laid flat	0·62	0·44
Length of tarsus, foot, and claws	2·62	2·12
Longest whisker (reaching to beyond the axil of the thigh)	3·25	3·0
Skull, from upper edge of <i>foramen magnum</i> to end of nasal bones	1·25	
Skull, from lower edge of ditto to front of upper incisors	1·12	
Breadth across hinder part of zygomatic arches	0·87	
Ditto, between orbits	0·5	
Length of lower jaw from condyle to inner base of incisors	0·72	
Teeth-line, upper jaw	0·18	
Teeth-line, lower jaw	0·18	
Space between inner edge of 1st molars	0·18	
Across tympanic bones	0·93	

5. *Dipus Loftusi*.

Dipus Loftusi, Blf. East Pers. p. 75.

1 ♂: Bushire, 6. 12. 83.

1 ♀ juv.: Tanjistan, Nov. 1876.

1 ♀ and four foetal young: Nov. 1876.

The foetal young of this species have the whiskers fairly well developed, and the tail is less than half the length of the head and body.

Length of largest specimen (spirit):—

	in.
Head and body	5·37
Tail	6·0
Tarsus, foot, and claws	1·95

6. *Lagomys rufescens*, Gray.

Lagomys rufescens, Blf. East Pers. p. 83.

1 ♂: Bushire, 4. 1. 84.

This agrees well with the description of it by Mr. Blanford, except that the chin, throat, and underparts are a silky yellowish white, as are also the fore and hind feet and the soles of the feet. The longest whisker is white at its extremity, and the lower series of 4-5 white throughout. This is recorded from Afghanistan, Northern Persia, and Mesopotamia, but not from S.E. Persia.

Length 7.5 inches.

Among *Birds* I have to add:—

1. *Falco peregrinator*, Sund.

Falco peregrinator, Sund., Blf. East Pers. p. 103.

Four live *birds* were netted at Bushire and sent to me for the Rev. Mr. Watson, who trained them for the quarry. All belonged to the *atriceps* type.

2. *Circus macrurus*, Gmel.

2 ♂: Bushire.

1 ♂: Fao, Shat-el-Arab.

3. *Hypocolius ampelinus*, Bp.

1 ♂, 1 ♀: Bushire, 13. 9. 83.

According to Mr. Cumming this species passes through Bushire in November. Its range extends N.E. to Fao, on the Shat-el-Arab, as far as at present known, southward to Sind. It breeds in the country. Mr. Cumming and Mr. Betts have taken the eggs at Fao. This is not recorded from E. Persia by Mr. Blanford.

4. *Ardeola leucoptera*.

Several specimens from Bushire. Breeds in June and July.

5. *Sterna fuliginosa*, Gmel.

2 ♀, Bushire, in breeding-plumage, received with ten eggs; and 1 ♀ taken on the Astola Island, S. Persia.

6. *Pelecanus onocrotalus* and *P. crispus*.

Both common in the Persian Gulf. The first has been found breeding at Fao, or rather 50 miles west, on a mud island surrounded by a large marsh, whence Mr. Cumming obtained five eggs.

7. *Phænicopterus minor*, Geoffr.

A male sent to me from Lingah by a Mr. Belcher, a passenger to Bussorah, with a note to the effect that it was shot out of a flock of larger ones, evidently *P. antiquorum*.

Among *Reptiles* the collection contains several species not recorded from Persia.

1. *Stellio nuptus*, var. *fuscus*.

Stellio nuptus, var. *fuscus*, Blf. East Pers. p. 320.

2 ♂, 1 ♀: Bushire, July 1876.

Mr. Blanford records this from Jalk and Kalagan, in Beloochistan, and not from Persia.

2. *Centrotrachelus Asmusi* *.

Centrotrachelus Asmusi, Strauch, Blf. East Pers. p. 337.

3 ♂: Bushire, July 1883.

Largest specimen 23·5 inches in length. I have had a live specimen since August 1882, still in excellent condition. The animal is extremely lively during the hot hours of the day up to 4 o'clock; after this hour it sleeps soundly, curling itself in a corner of the box in which it is kept. Its means of defence is the spiny tail it possesses, which it lashes like a whip when disturbed. It is extremely fond of having cold water thrown on its body; it then appears much pleased, standing high on its fore legs, with head erect, turning it round, upwards, and looking with each eye, and extending the loose skin of its body to double the usual size. Whether the animal burrows for itself or occupies the burrows of field-rats &c. is a question, as, although it has a foot of soft sand in the box (without a bottom), on the bare ground, it has never yet attempted to burrow.

3. *Hemidactylus Cocteau*, D. et B.

Three: Charbar, Beloochistan, June 1880.

Two: Charbagh, near Bushire, August 1876.

One: Bushire, August 1883.

Four: Tanjistan, July 1877.

The non-entry of this species by Mr. Blanford is evidently an omission.

* ? *C. loricatus*, Blf. 'Eastern Persia,' ii. p. 340, described from the neighbourhood of Bushire.

4. *Gymnodactylus brevipes*.

Gymnodactylus brevipes, Blf. East Pers. p. 344.

Three : Bushire, Oct. 1883.

One : Tanjistan, Aug. 1876.

This has been recorded from Aptar, near Bampur, in Beloochistan. Mr. Cumming's collection from Bushire contains well-marked specimens of this species.

5. *Gymnodactylus scaber*, Rüpp.

Thirteen : Bushire, June, July, August, 1883.

Seven : Tanjistan, September 1876.

In form the counterpart of *Gymnodactylus petrensis*, Murray (Vert. Zool. Sind, p. 362).

Rostral broader than high and cleft above. Upper labials 10-12; lower labials 8-10. Pupil vertical; first labial and three small shields behind rather smaller than those covering the muzzle; interorbital space and occiput with large conical tubercles interspersed, a few also on the muzzle and a line of 3-4 in front of each eye. Two pairs of chin-shields, the first largest and in contact. Back covered with granular scales and sharply-keeled trihedral tubercles, the latter as large as or slightly larger than the vertical ear-opening, and arranged across the middle of the trunk in 14 longitudinal rows; between the hind limbs the number is six. The tubercles on the sides of the body are rather smaller and subearinate. Scales across the middle of the abdomen in 18-20 rows. Preanal pores 5-6. Outer surface of limbs with large trihedral tubercles. A pair of tubercles on each side of the sacral region. The fore limb laid forward reaches the end of the snout; laid back it reaches the axil of the hind limb. The hind limb laid forward extends beyond the axil of the fore limb. Tail verticillate, with three rows of sharply-keeled trihedral tubercles on each side to within an inch of the tip, beyond which it is covered with irregularly-arranged imbricate scales. Subcaudals distinct, single, about 44-54; a few of the anterior ones bifid.

Length 4.5 to 5 inches, of which the tail is 2.5 to 2.75.

Colour greyish brown, with three longitudinal rows of dusky subquadrate spots on the back; in some specimens one more row of rather indistinct spots on each side. Tail with 10-12 dark bands above.

Hab. Bushire and Tanjistan, in Persia; Fao, in Southern Mesopotamia, at the head of the Persian Gulf, on the banks of the Shat-el-Arab, and Charbar, in Beloochistan.

Collected by Mr. W. D. Cumming, to whom I am indebted for a large collection of reptiles, fish, &c. from Bushire and Fao, in Southern Mesopotamia.

The synoptical table below will show the differences between this species and the other allied forms of *Gymnodactylus*.

	Dorsal tubercles.	Abdominal scutes.	Pores.		Labials.	
			Femoral on each thigh.	Pre-anal.	Upper.	Lower.
<i>Gymnodactylus caspicus</i> , <i>Eichwald</i>	18-20	?	* 32-34		11	8-9
— <i>brevipes</i> , <i>W. Blf.</i>	10	22	.....	4	9	7
— <i>heterocercus</i> , <i>W. Blf.</i>	12	25-30	no ne		8-10	7-8
— <i>petrensis</i> , <i>Murray</i>	12	34-35	.....	4	10-12	8-10
— <i>scaber</i> , <i>Rüpp.</i>	14	18-20	.....	5-6	10-12	8-10
— <i>kachensis</i> , <i>Stol.</i>	12-14	28-30	* 48		11-12	8-9
— <i>frænatus</i> , <i>Günther</i>	6-8	34	.....	4	11	9
— <i>Oldhami</i> , <i>Theob.</i>	30	?	* 40		11	10

6. *Pristurus rupestris*.

Pristurus rupestris, Blf. East Pers. p. 350.

Seventeen specimens from Bushire and Tanjistan, 1876-77.

7. *Ceramodactylus Doriae*.

Ceramodactylus Doriae, Blf. East Pers. p. 353.

I have seven specimens of this lizard from Tanjistan, nearly 300 miles further north-east of Bunder Abbas, where Marquis Doria's single specimen was obtained.

8. *Ceramodactylus affinis*.

General form of *Ceramodactylus Doriae*, but of a more robust habit. The nostril is placed rather behind the outer hind angle of the rostral, instead of immediately above and between the suture of the rostral and first labial. The three shields behind the nostril are flat, and not distinctly swollen, as in *C. Doriae*. The mental is rather of a different shape, having slightly concave instead of straight sides, and a very

* In a continuous line on both thighs.

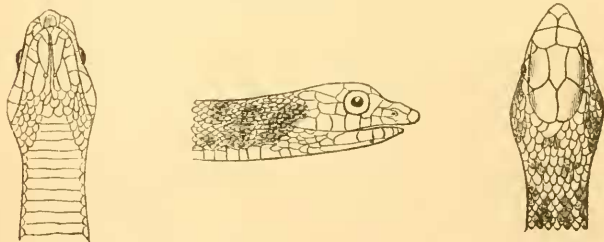
convex hind margin. Upper labials 11, with a number of smaller ones behind, scarcely larger than the granular scales of the tympanic region. Tail not attenuate, as in *C. Dorie*, but ends rather abruptly; it is three fifths the length of the head and body, while that of *C. Dorie* is nearly the length of the head and body. The head is short and thick, and presents a very different aspect from that of *C. Dorie*; its height is about a fifth less than its greatest breadth, or a fifth less than that of *C. Dorie*, both in height and breadth. The fore and hind limbs are very much stouter and shorter than those of *C. Dorie*. The fore limb laid forward, the tips of the fingers reach only to the end of the snout, while in *C. Dorie* the tips of the fingers extend beyond the snout by the length of the foot. The hind limb laid forward does not extend as far as the axil of the fore limb, while that of *C. Dorie* reaches nearly to the ear-opening. Fingers and toes much shorter and more robust.

Length, head and body 2·62 inches, tail 1·37.

Colour: instead of the spotted character of the markings of *C. Dorie*, this species is banded, the bands being rather curved, with the concavity in front. There are four bands, one on the occiput, one behind the shoulder, another on mid-trunk, and the fourth on the loins. The tail has 7-8 dark bands. The ground-colour is apparently ochraceous. There are 2-3 dark oblique streaks below the eye along the labials. Sides of the body slightly darker than the back.

Hab. Tanjistan, in Persia. Two specimens among seven of *C. Dorie*, collected in 1877.

9. *Rhagerrhis productus*, Ptrs.



Head moderate, distinct from neck. Snout rather depressed and produced beyond the mental. Tail short; anal bifid. Eyes rather large; pupil circular; rostral produced, obtuse in front, reverted on to the upper surface of the head,

and forming a triangular suture with the prefrontals; below, the rostral is deeply concave. Nasals 2. Nostrils situated in the anterior portion of the postnasal, which is received in the hind, nearly quadrangular, cavity of the prenasal. Loreal 1, square. Preocular 1, reverted on to the upper surface of the head, but not touching the vertical. Postoculars 2. Upper labials 8; lower labials 11, 6 in increasing series from the mental, and 4-5 other smaller ones about the size of the adjoining scales. Sixth upper labial the largest; the fifth under the eye. Mental narrow, angular and pointed behind, slightly convex in front. Mental groove distinct. Two pairs of subequal chin-shields. Two pairs of frontals; vertical elongate, obtusely triangular in front and triangular behind, where it is received in the triangular concavity of the occipitals. Occipitals rounded behind, convex laterally, and longer than their greatest width; temporals variable, generally 2-3 alongside the occipitals, and in some split into small plates. Scales in 17 rows, all, even the head-shields, minutely punctulated with brown (only seen through a Coddington lens). Ventrals slightly angulated.

Colour (spirit-specimens) ochraceous, with equally distributed dusky spots in five rather oblique series. A small dark brown spot under the eye; another less distinct above it (not present in all specimens), a third obliquely behind the eye, followed by a large temporal spot, also oblique, and extending beyond the last labial. Lower parts unspotted, pale yellow.

Hab. Bushire, 1 ♂, 2 ♀; Tanjistan, 3 ♂, 2 ♀.

Length of largest specimen 46 inches, of which the tail is 7 inches; length of smallest specimen 15 inches, of which the tail is 2·5 inches.

10. *Bufo viridis*, Laur.

The following is a description of specimens from Bushire:—

Crown of the head flat, smooth, and devoid of osseous ridges; orbitals elevated and covered with horny-tipped tubercles; interorbital space equal to the width of the eyelid. Hind crown, back, and the upper surface of fore and hind limbs covered with rather close-set horny-tipped tubercles. Parotoids oblong, flattened above about their middle, and separated from each eye by a deep groove. Length of each parotoid equal to the distance between its front edge and the nostril. Tympanum distinct, about one half the size of the eye. Under surface of the body smooth, without any trace of tubercles. Fore feet with a large mesial palmar pad and a smaller one at base of first finger. Laid side by side the

first finger is very slightly longer than the second and as long as the fourth; third finger longest. Tarsus with a mesial and lateral longitudinal row of distant tubercles, and a cutaneous fold on the inner side extending to the inner metatarsal tubercle. The tubercle on the outer edge scarcely so prominent as the inner one, which is elongate. Soles of the hind feet faintly tuberculate. Toes half-webbed; the tip of the first reaches the second joint of the second toe. Hind limb long; laid forward alongside the body the metatarsal tubercle reaches the eye, and one half of the foot extends beyond the snout.

Length 3 inches; hind limb from anus to tip of second finger 4·2 inches.

Colour yellowish, a dark spot on each eyelid; another oblique one from the hind edge of the eye to the tympanum, and a third very small one on each nostril; fore and hind legs with 2-4 transverse blotches on their upper surface. Sides of the first and upper surface of first and second fingers black. Under surface pale yellowish. Tips of toes slightly swollen and of a brownish colour.

These specimens come near to *Bufo olivaceus*, Blanf. (East Pers. p. 434, pl. xxviii. fig. 3), but differ from it by having the dorsal surface closely set with horny-tipped tubercles, a flat instead of a concave crown, by its under surface being smooth and not tuberculate, and by its shorter hind limbs. From *B. vulgaris* it is distinguished by its longer hind limbs, having a cutaneous tarsal fold, a distinct tympanum, and no dark band below the parotoid.

XIV.—*Additions to the Reptilian Fauna of Sind.*

By JAMES A. MURRAY.

SINCE the publication of my work on the 'Vertebrate Zoology of Sind,' a collated descriptive account of all the species of mammals, birds, and reptiles (including several new species) known to inhabit the province, some little interest appears to have been aroused in zoological inquiries, which has resulted in the Kurrachee Museum acquiring several collections of reptiles from hitherto unknown localities in Upper Sind.

Among these are four species from the barren sandy wastes of the frontier districts, collected by my indefatigable corre-